THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter

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Plant Industry Station — Beltsville, Maryland
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IN THIS ISSUE

Robert O. Magie describes Stemphylium leaf spot of gladiolus, which has caused loss to cut-flower growers in Florida annually during the past ten years, page 344.

An enation disease of primrose, cause unknown, is reported by Frank P. McWhorter and W. C. Price, page 345.

Philip J. Leyendecker reports the occurrence of cabbage yellows in southern New Mexico, page 346.

Progress reports on late blight, tobacco blue mold, and downy mildew of cucurbits, page 347.

O. C. Boyd lists some diseases that have been unusually prevalent in Massachusetts this year as a result of wet weather, page 348.

Brief notes, page 349, include some reports of new or unusual records of plant diseases: P. P. Pirone reports Botrytis causing leaf and flower blight of dogwood in New York and New Jersey; J. L. Weimer and O. E. Sell report the discovery of stem nematode and Fusarium wilt on alfalfa in Georgia; James G. Horsfall describes conditions accompanying an unusual occurrence of tomato blossom-end rot; and C. Emlen Scott reports infection of late-formed peach leaves by leaf curl in California.

Check list revision, by Freeman Weiss, page 352.

June weather, page 376.

STEMPHYLIUM LEAF SPOT OF GLADIOLUS IN FLORIDA

Robert O. Magie

A leaf spot caused by a Stemphylium has brought an annual loss to the gladiolus cut-flower growers of the State during the past decade. Two-thirds of the acreage, about 3400 acres, is planted to one of the susceptible varieties, Picardy. The disease may kill the leaves before flowering, causing a total loss; or more often the leaves are killed prematurely after the flower spikes are cut, resulting in smaller, less vigorous corms. The fungus attacks the leaf and stem tissue, causing round, pale yellow lesions with a characteristic reddish-brown center. The translucent spots, visible from either side of the leaf, are more easily identified by viewing the leaf toward the sun. The diameter of the chlorotic area is 1 to 3 mm., depending on the variety and temperature.

Unpublished information indicates that F. T. McLean isolated a Stemphylium from gladiolus at this Laboratory early in 1944. A Stemphylium was isolated again early in 1947 from the varieties Lavender Ruffles and Picardy. Its pathogenicity was proved by inoculation and reisolation from Picardy. The fungus produces spores on potato dextrose and malt agar media at ordinary room temperatures, but sporulation is sparse or absent above 80° F.

Infection takes place during wetting periods as short as ten hours. Dew periods are sufficient for infection. Epiphytotics occur in the absence of rain, but occasional fogs undoubtedly play a part in the rapidity with which the fungus spreads and kills the plants. The most susceptible varieties often have their leaves killed two weeks after the first infections are visible.

Varieties of medium susceptibility like Picardy are always affected more severely by the disease when grown near the very susceptible varieties, Stoplight and Casablanca. The disease is often seen first on the more susceptible varieties. It then spreads radially to the less susceptible varieties in a pattern of infection, decreasing with distance from the focal point.

The disease disappears during the summer and autumn months and reappears in the winter, usually about three weeks after a cold period. Epiphytotics occur when the average daily temperature range is from 55° to 75° and 64° to 84° F. Higher average temperatures sharply reduce or prevent infection. Although favorable weather conditions occur in the autumn, the disease has not been seen at this time.

Fungicides have not provided complete protection from the leaf spot

disease, but even the most susceptible varieties are protected sufficiently, by spraying with the zinc ethylene bis-dithiocarbamate materials, to keep the foliage green until normal corm harvest time. Phygon at 1/2-100 was as effective as Dithane and Parzate sprays but caused a reduction in the size of the corms. Phygon has also caused the leaves to die two weeks before those on the non-sprayed plants. It is suggested that the more susceptible varieties should not be planted near those which are less susceptible, and that successive plantings of the latter should be separated by resistant varieties.

GLADIOLUS INVESTIGATIONS, VEGETABLE CROPS LABORATORY, FLORIDA AGRICULTURAL EXPERIMENT STATIONS, BRADENTON, FLORIDA

ENATION DISEASE OF PRIMULA

Frank P. McWhorter[1] and W. C. Price[2]

During the 1947-48 season, a number of plants of a large-flowered white variety (Pure White Improved) of Primula malaccides, grown in the Phipps Conservatory at Pittsburgh, developed crenate veins which gave the foliage a ridged or fluted appearance. Five such plants later developed enations on the upper surfaces of their leaves. The enations arose from the crenate veins and appeared during the early stages of flowering.

At first, the enations were simple leaf-like structures. Later, new outgrowths arose from the bases of the original enations and the original enations themselves gave rise to secondary enations. Such compounded structures appeared as clusters of five to eight leaflets, extending as much as 20 mm. above the parent leaf. In other cases, the original enation became filiform, growing to a length of 25 mm. or less. The composite symptoms gave the plans a bizarre appearance and spoiled their value as ornamentals. Limited inoculation trials failed to show that the disease is infectious.

All the enations arose from veins, a circumstance that simulates the usual condition obtaining in the enation mosaic of peas. However, in the case of peas, where the cuase is known to be a virus, most of the enations originate on the under side of the leaves, whereas the Primula enations observed always arose on the upper surface. The plants showing crenate veins were among a planting of about a thousand that were grown in pots in fresh potting soil. The history of the planting indicates that the disease was introduced in the seed.

OREGON AGRICULTURAL EXPERIMENT STATION, U. S. BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, AND UNIVERSITY OF PITTSBURGH

1 Plant Pathologist, Oregon Experiment Station, Agent U. S. D. A., Division Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering. Contributed as Senior Research Fellow, University of Pittsburgh, January to May 1948.

2 Research Professor of Biology, University of Pittsburgh.

THE OCCURRENCE OF CABBAGE YELLOWS IN SOUTHERN NEW MEXICO

Philip J. Leyendecker

Early this season a number of diseased cabbage[1] plants were brought to the New Mexico Experiment Station for diagnosis. The diseased cabbage plants exhibited typical unilateral dwarfing. Dark brown coloration of the vascular elements of the stem and petioles was very pronounced. Superficially, the symptoms resembled those of bacterial black rot, caused by Xanthomonas campestris (Pammel) Dowson. Diseased stem and petiole tissue was plated out on potato dextrose agar and pure cultures of Fusarium oxysporum Schlecht. f. conglutinans Snyder & Hansen[2] were obtained in every case. This report constitutes the first authentic record of the occurrence of cabbage yellows in New Mexico.

More acreages of cabbage are being planted in southern New Mexico each year and increasing reports of the disease may be expected. On May 5 a survey was made of the original infested field, and it was found that approximately 5 to 10 percent of the plants, which at that time had six to eight large leaves, were diseased. Adjacent cabbage fields were inspected and each field contained varying numbers of diseased plants.

It is believed that the causal organism has been present in southern New Mexico for a number of years. Most growers attributed cabbage yellow losses to faulty transplanting, insect damage, or hot weather. All growers agreed that the symptoms observed this year have occurred in their fields for a number of years. Observations will continue relative to spread, virulence and amount of damage.

BIOLOGY DEPARTMENT, NEW MEXICO EXPERIMENT STATION, STATE COLLEGE, NEW MEXICO

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[1] Copenhagen Market is the most widely planted variety in southern New Mexico.

[2] Identification made by W. C. Snyder and H. N. Hansen, University of California.

PROGRESS REPORTS ON LATE BLIGHT, TOBACCO BLUE MOLD, AND CUCURBIT DOWNY MILDEW

LATE BLIGHT (Phytophthora infestans)

Although several additional States reported its appearance, development of late blight on both potato and tomato, for the most part, has been rather slow since the preceding report. Prior to the end of June threatening outbreaks were reported on tomato and potato in the three southern Eastern Shore Counties of MARYLAND, and in adjacent DELAWARE. In both areas continued wet weather made the use of ground equipment difficult, and heavy rains washed off dusts applied by airplanes. However, hot dry weather late in June checked the disease.

Elsewhere, the disease has been widely reported, especially on potato, and although spread has been slow or infection was limited to few fields or single fields in a location, it still has developed into a position of potential threat under favorable conditions. Appearance has been reported on potato in WEST VIRGINIA, PENNSYLVANIA, NEW JERSEY, RHODE ISLAND, CONNECTICUT, MASSACHUSETTS, VERMONT, and PRINCE EDWARD ISLAND, and on tomato in PENNSYLVANIA, and WEST VIRGINIA, in addition to the localities already reporting its presence. It was also found in western MARYLAND and western VIRGINIA.

In the Charleston area of SOUTH CARCLINA potato harvest was completed with a loss averaging probably 5 to 10 percent, but varying up to 50 percent on individual farms. With the addition of loss from rejected and re-sorted cars the total loss, based on monetary value of the crop was about 15 to 20 percent. Undusted or poorly dusted tomato crops in the area suffered heavily. The tomato crop in Orangeburg County was not seriously damaged because the disease became established late.

In the Norfolk area of VIRGINIA individual fields severely attacked two weeks prior to normal harvest showed some tuber rot and considerable reduction in yield of No. 1 tubers, but the overall damage has not been determined.

STRAINS OF THE LATE BLIGHT FUNGUS

"On June 24 tomato plants growing next to a heavily blighted potato field in Lancaster County, Pennsylvania, had a few lesions on the lower leaves, with black centers, definite margins, and no evident sporulation. Sporulation was heavy on potato leaves in the nearby potato field. Dr. W. R. Mills has isolated the potato strain of Phytophthora infestans from the infected tomato leaves. This demonstrates the difference in appearance and infection capabilities of the potato and tomato strains under field conditions." -- R. S. Kirby

TOBACCO BLUE MOLD (Peronospora tabacina)

In MARYLAND, blue mold was reported as widely distributed in plant beds and more serious than for several years, although Fermate gave excellent control when properly used. The disease caused a shortage of plants in Calvert County.

In TENNESSEE, the disease occurred widely and caused considerable inconvenience, but no cases were noted where farmers were unable to obtain enough plants. Blue mold spread took place regardless of weather, once it became established, and in some instances the disease was found during the very dry early spring. Apparently, heavy dews were sufficient for spread. Here again, Fermate gave good results where used properly.

DOWNY MILDEW (Pseudoperonospora cubensis) OF CUCURBIT CROPS

Primary infection was found on cucumbers in northern NORTH CAROLINA, in Warren County at Norlina near the Virginia line, on July 3. On an earlier trip, June 23-25, it had been observed only as far north as Washington County. Prior to June 22 the disease had developed rapidly in the south-central portions of the State, but hot dry weather since that time apparently slowed its development in areas farther north.

Downy mildew appeared on cantaloups in the Lower Rio Grande Valley in TEXAS about June 1, but continued dry weather since allowed very little spread. Striking varietal differences were noted in the Station planting. Imperial No. 45 was most badly affected, with damage up to 50 percent of the foliage in some parts of the rows. The resistant strains that made up most of the planting of about an acre rarely showed more than 10 percent damage; some were entirely free.
(Summarized from reports of Key Pathologists of the Crop Plant Disease Forecasting Service, received to the middle of June)

DISEASES AND WEATHER IN MASSACHUSETTS

O. C. Boyd

Following an unusually favorable spring season for fungous and bacterial diseases, I am listing below a few diseases that are or have been conspicuous and damaging as a result of the abnormally wet weather. Incidentally our rainfall at Amherst for May was 5.83 inches compared with a normal of 3.60 inches; 16 rainy days compared with 12 in a normal season. Precipitation for June was almost two inches above normal. In connection with my apple scab control spray service, I recorded six periods during May and six during June.

Fruits: Frog-eye (black rot) and scab of apple. Spur blight and anthracnose of red raspberries. Scab and Fabraea leaf blight of pear. Red stele of strawberry; appearing in the Cape berries for the first time and very damaging in certain other localities.

Vegetables: Halo bacterial blight of French Horticultural as well as green snaps. Early blight and late blight of celery. Bacterial blight (leaf and pod spot) of garden peas; rarely a factor at all in this state. Rust on early transplanted lettuce (Puccinia extensicola var. hieraciata); my first encounter with this disease.

Potatoes: Seed-piece decay resulting in skips, stunted plants and various stages of black-leg or brown-leg of the lower stem; initial attack assumed to be due to Fusarium spp. Late blight, although appearing unusually early (June 30 in Berkshire County; July 9 in Hampshire County) is not at the general, widespread stage yet.

Ornamentals: Botrytis blight of tulip, Botrytis blight of peony. Anthracnose of sycamore and white oak. Anthracnose of maples and white ash (Gloeosporium spp.). Gnomonia leaf spot of elm. Bacterial blight of lilacs. Rust of ash. Defoliation from rust of ash and from anthracnose of sycamore have been so severe and general during 1946 and 1947 that most ash trees in the eastern part of the State and sycamores over all the State are showing about 5 percent to 10 percent of a set of leaves, with many ash trees dead outright. No heavier outbreak of willow scab has ever been seen than the present epiphytotic. Varieties heretofore untouched are "blighting" badly. A severe case of bacterial wilt of carnation was observed during June in a nearby greenhouse; my first observation of this disease. This is the first year bacterial blight has been damaging on Oriental poppies.

Tobacco: Wildfire is appearing in increasing amounts in tobacco fields--more than in recent past years.

UNIVERSITY OF MASSACHUSETTS, AMHERST

BRIEF NOTES ON PLANT DISEASES

BOTRYTIS LEAF AND FLOWER BLIGHT OF DOGWOOD

By P. P. Pirone

The wettest spring in seventy-seven years in the metropolitan New York area was responsible for the appearance of more than the usual number of fungus diseases of trees. Among the more unusual ones was a

leaf and flower-bud blight of flowering dogwood (Cornus florida). Specimens of blighted buds submitted from several New Jersey residents and of blighted leaves from a number of persons in New York State, all yielded pure cultures of a species of Botrytis. The fungus was isolated from the flower stems well below the blighted petals and from brown lesions on the leaves.

On Difco potato dextrose agar the conidia are globose hyaline to pale yellow, 7-11 x 5-7 microns. Black, flat sclerotia, 1-3 mm. in diameter and 1-2 mm. thick in diameter and 1-2 mm. thick also develop abundantly on the agar.

No attempt was made to inoculate healthy plants with these isolates, but the constant association of the fungus with the infected parts suggests that this fungus was primarily responsible for the leaf and flower blight.

The disease caused considerable concern to owners of dogwood trees, most of whom reported they had never seen this disease before.
NEW YORK BOTANICAL GARDEN

STEM NEMATODE AND FUSARIUM WILT OF ALFALFA OBSERVED FOR THE FIRST TIME IN GEORGIA

By J. L. Weimer and O. E. Sell

On April 14, 1948, the writers visited an alfalfa field near Macon, Georgia, to investigate the cause of the rapid depletion of the stand. It was soon evident that the plants were being killed by the stem nematode (Ditylenchus dipsaci (Kühn) Filipjev). Specimens were sent to Dr. G. Steiner, Division of Nematology, U. S. Department of Agriculture, who confirmed the identification of the nematode involved and added that, so far as his records go, this is the first report of the presence of this pest in Georgia. He stated further that although he believes it to be widely distributed, most of the records of the distribution of this nematode are from the Western States. The disease was fairly generally distributed over the field in question, although the damage was more serious in lower parts than in higher. The stand was beginning its second year and already some areas were badly depleted. The land had grown alfalfa for five consecutive years previous to the planting of the present stand. It is not known how long the stem nematodes have been in this field or how they became established there. The seed used in the 1946 planting apparently was not the source of the nematode infestation because a second field was planted with some of the same lot of seed at the same time and no nematodes were found in it.

The Fusarium wilt of alfalfa also was found in the same field. So far as our records go this is the first report of this disease in Georgia. It was of little commercial importance at this time.
DIVISION OF FORAGE CROPS AND DISEASES

AN UNUSUAL OCCURRENCE OF TOMATO BLOSSOM-END ROT

By James G. Horsfall

On July 8 I observed an unusual case of blossom-end rot on tomato in a field of Earliana. Ecological conditions that bring it on are at the opposite pole from the normal. Usually we expect to see blossom-end rot during the very hot, dry spells of the summer when soil moisture content is low. In this particular case, the soil moisture content is very high, but, of course, the tomatoes have been growing for several weeks under cool conditions of very high humidity; as a matter of fact, ever since they were transplanted in early May. Over the weekend of the Fourth of July we had very hot weather with drying winds, and, apparently, the blossom-end rot was induced on the tomatoes in spite of the fact that the roots were in very damp soil. Apparently, the roots have not been forced to extend themselves because of the high moisture content up until now.
CONNECTICUT AGRICULTURAL EXPERIMENT STATION, NEW HAVEN

SEVERITY OF PEACH LEAF CURL IN CALIFORNIA IN 1948 AND INFECTION ON LATE-FORMED LEAVES

By C. Emlen Scott

Peach leaf curl [Taphrina deformans] has been particularly abundant in central and northern California during the current season. During May, unsprayed trees were commonly seen which appeared to have no normal leaves. One tree was examined in Santa Cruz County on which only three or four leaves could be found which showed any normal tissue.

As shoot elongation proceeded it was commonly reported that "new" leaf curl infections were appearing. It is true that "new" infections continued to appear over a long period, but the writer is not attempting to explain their origin. On June 29, 1948, one orchard was visited near Stockton where a large percentage of the shoots bore infected leaves near their tips. One representative shoot was collected on which there were three infected leaves 40 inches from the base. The oldest infected leaf on this shoot was 25 inches from the base and there was no evidence of any leaves having been lost. There was about four inches of shoot growth bearing healthy immature leaves beyond the last infected leaf. Most of the infections were small, about 1/8 inch in diameter, the largest being about 1/2 inch long.
AGRICULTURAL EXTENSION SERVICE, UNIVERSITY OF CALIFORNIA, BERKELEY

CHECK LIST REVISION

Freeman Weiss

ERICACEAE*

ARCTOUS (ERICACEAE)

ARCTOUS ALPINUS Niedenzu, BLACK BEARBERRY.. Low shrub of alpine areas in the Northwest, grown for ground cover.

Pucciniastrum sparsum (Wint.) Fisch. (II,III), rust. Alaska. O and I on Picea excelsa in Europe.

CHIOGENES (ERICACEAE)

CHIOGENES HISPIDULA (L.) Torr. & Gray, CREEPING SNOWBERRY. Evergreen herbs of the far North, used in rock gardens.

Chrysomyxa chiogenis Diet. (II,III), rust. Mich., N.H., N.Y., Wis. O and I unknown.

EPIGAEA (ERICACEAE)

EPIGAEA REPENS L., TRAILING ARBUTUS. Creeping evergreen herb of the far North and alpine areas in the East, collected for fragrant bloom and grown in rock gardens.

Cercospora epigaeae Ell. & Dearn., leaf spot. N.Y., N.Car., Wis.
Discosia maculicola Gerard, on old leaves. Md., W.Va.
Microsphaera alni DC. ex Wint. var. vaccinii (Schw.) Salm., powdery mildew. Conn. to Va. and Wis.
Phyllosticta epigaeae Pk., leaf spot. Mass., N.Y.

PHYLLODOCE (ERICACEAE)

PHYLLODOCE E PETRIFORMIS (Smith) D.Don, MOUNTAIN-HEATH (1), other spp. (2). Evergreen woody herbs of alpine areas mostly in the Pacific Northwest; used in rock gardens, a minor honey plant and wildlife food plant.

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* Most of the genera of this family have been covered in earlier sections; see partial list of genera in PDR 31: 412. 1947. The genera included here are mostly herbaceous.

PHYLLODOCE cont.

Antennaria rectangularis Sacc., sooty mold. Alaska (2)
Diplodina rostrupii Vest., on stems. Alaska (2)
Exobasidium vaccinii-uliginosi Boud., witches'-broom. Ore. (1)
Herpotrichia nigra Hartig, brown felt. Ida. (1)

EUPHORBIACEAE

ACALYPHA (EUPHORBIACEAE)

ACALYPHA VIRGINICA L., VIRGINIA COPPERLEAF, 3-SEEDED MERCURY (1). Annual herb of woodlands in the Northeastern and Central States to Fla. and Tex., a wildlife food plant. A. WILKESIANA Muell. Arg., PAINTED COPPERLEAF (2). Shrub of s. Pacific islands, grown for ornament as conservatory plant and also in the open in the far South. Other spp. (3)

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. Hawaii (2,3)
Cephaleuros virescens O.Kunze, green scurf. P.R. (3)
Cercospora acalyphae Pk., leaf spot. N.Y. to Ala., Tex. and Wis. (1); Ala., N.Y., Okla., Tex. (3)
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla. (2)
Erysiphe cichoracearum DC., powdery mildew. Wis. (1)
Heterodera marioni (Cornu) Goodey, root knot. Md. (1)
Meliola arecibensis F. L. Stevens, black mildew. P.R.
Phyllosticta sp., leaf spot. N.J. (2)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3)
Plasmopara acalyphae G.W.Wils., downy mildew. Wis. (1)
Physalospora abdita (Berk. & Curt.) N.E.Stevens, on stems. Hawaii (2)
Ramularia acalyphae Tharp, leaf spot. Tex. (3)
Rhizoctonia solani Kuehn, root rot. Ill. (2)
Rosellinia bunodes (Berk. & Br.) Sacc., root rot. P. R. (2)
Synchytrium aureum Schroet., leaf gall. Wis. (1)
Volutella acalyphae Atk., on stems. Ala.

CNIDOSCOLUS (EUPHORBIACEAE)

CNIDOSCOLUS STIMULOSUS (Michx.) Engelm. & Gray (1) and C. TEXANUS (Muell. Arg.) Small (2), TREAD-SOFTLY, SPURGE-NETTLE. Perennial herbs of the Southeastern and Gulf States, wildlife food plants.

Cercospora jatrophae Atk., leaf spot. Ala. (1)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2)
Septoria jatrophae Heald & Wolf, leaf spot. Ala. (1); Okla. (2); Tex. (1,2)
Uromyces agnatus Arth. (II,III), rust. Fla., S.Car. (1). O and I unknown.

EUPHORBIA (EUPHORBIACEAE)

EUPHORBIA PULCHERRIMA Willd., POINSETTIA. Shrub of tropical America; commonly grown as a pot plant under glass, and in the open in the far South.

Botrosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. Tex.
Botrytis cinerea Pers. ex Fr., tip blight, stem canker. Mo., Tex., Wash., Alaska
Cercospora pulcherrima Tharp (also var. minor Tharp), leaf spot. Tex.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Colletotrichum gloeosporioides Penz., on stems. Tex.
Corynebacterium poinsettiae Starr & Pirone, bacterial canker, leaf spot. Md., N.J., N.Y., Pa.
Fusarium sp., stem rot, wilt. Fla., N.J.
Gloeosporium intermedium var. poinsettiae Sacc. on stems. Calif., Ind.
Heterodera marioni (Cornu) Goodey, root knot. N.Y.
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Tex.
Phytophthora sp., stem rot, wilt. N.J.
Pythium debaryanum Hesse, stem rot. Okla.
P. ultimum Trow. Calif., N.J.
Rhizoctonia solani Kuehn, root rot. Fla., Ill., N.J., Tex.
Sclerotinia sclerotiorum (Lib.) DBy., stem rot. Wash.
Sphaceloma poinsettiae Jenkins & Ruehle, spot anthracnose. Fla., Hawaii
Uromyces proëminens (DC.) Pass. var. poinsettiae (Tranz.) Arth. (0,I,II,III), rust. Okla., Tex.

EUPHORBIA spp. (cultivated), as E. COROLLATA L., FLOWERING SPURGE (1); E. CYPARISSIAS L., CYPRESS S. (2); E. HETEROPHYLLA L., PAINTED S., MEXICAN FIREPLANT (3); E. MARGINATA Pursh, SNOW-ON-THE-MOUNTAIN (4); E. MILII Desmoul. (E. splendens Bojer), CROWN-OF-THORNS (5). Annual (3,4) or perennial herbs (1,2), or woody (5); native (1,3,4), introduced from Europe and naturalized in the Eastern States (2), or from Africa and grown under glass; all grown for ornament.

Alternaria sp. (Macrosporium euphorbiae Barth.) leaf spot. Kans., Tex. (4)
Botrytis cinerea Pers. ex Fr., gray-mold blight. N.J. (4)
Cercospora euphorbiae Kell. & Swing., leaf spot. Kans. (1); Tex. (1,2)
C. euphorbiicola Atk. Nebr. (4)
C. heterospora Ell. & Ev. Wis. (1)
C. pulcherrimae Tharp. Okla. (4)
Cladosporium nervale Ell. & Dearn., on leaves. Wis. (1)

EUPHORBIA cont.

Diaporthe arctii (Lasch) Nits., on stems. Ga. (1)
(Fusicladium fasciculatum Cke. & Ell.): Cercosporidium f.
Melampsora euphorbiae (Schub.) Cast. (0,I,II,III), rust. Me. to Pa., Ind., and Wis. (2)
Microsphaera euphorbiae(Pk.) Berk. & Curt., powdery mildew. Md. to Ga., Kans., and Mich. (1); Ind., Kans., Mo. (4)
Phoma euphorbiicola (Schw.) Starb. (? Mycosphaerella sp.), on stems. Pa., Tex. (4)
Phyllosticta sp., leaf spot. Okla. (1); N.J. (4)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,4); Ariz. (5)
Puccinia panici Diet. (0,I), rust. Ohio to Ala., Tex., and Minn. (1); Miss. to Tex., Colo. and S. Dak. (4). II and III on Panicum virgatum
Tilletia euphorbiae L. Lenz, stem smut. La. (3)
Uromyces proëminens (DC.) Pass. (0,I,II,III), rust. The following vars. are segregated by Arthur: var. myristica (Berk. & Curt.) Arth., S.Dak. to Tex. and Colo. (4); var. poinsettiae (Tranz.) Arth., Ind. to Fla., Tex. and Kans. (3)
Verticillium albo-atrum Reinke & Berth., wilt. N.J. (5)

EUPHORBIA spp. (endemic and weeds), as E. DENTATA Michx., TOOTHED SPURGE (1); E. MACULATA L., SPOTTED SPURGE (2); E. SERPENS H.B.K., ROUND-LEAVED S. (3); E. SERPYLLIFOLIA Pers., THYME-LEAVED S. (3); E. SERPYLLIFOLIA Pers., THYME-LEAVED S. (4); other spp. (5). Annual (1,2,3,4) or perennial (5) herbs widely distributed in waste ground, sometimes troublesome weeds in cultivated fields and lawns; several are wildlife food plants.

Aecidium tithymali Arth. (0,I), rust. Ill., Ind., Iowa, Md., Nebr., N.Mex., Tex., Wis. (5)
Botrytis cinerea Pers. ex Fr., gray-mold blight. Conn. (1)
Cercospora euphorbiae Kell. & Swing., leaf spot. Tex. (1,2); Md., (5)
C. euphorbiicola Atk. Ala. (5)
Cercosporidium fasciculatum (Cke. & Ell.) Hoehn., leaf and stem mold. N.Car. to Ala., Tex., and Nebr. (2); Wis. (4); Kans., Md., N.J. (5). Variously reported as Fusicladium and Scolecotrichum, perhaps a Cercospora.
Cuscuta sp., dodder. N.J. (5)
(Fusicladium fasciculatum Cke. & Ell.): Cercosporidium f.
Heterodera marioni (Cornu) Goodey, root knot. Fla., Hawaii
Melampsora euphorbiae (Schub.) Cast. (0,I,II,III), rust. Calif. (5)
M. euphorbiae-gerardianae W.Müll. (II,III). Ind., Md., Va., W.Va., Wis. (5). 0 and I unknown.

EUPHORBIA cont.

M. monticola Mains (II,III). Nebr. to Tex., Calif., and Ore. (5). O and I unknown.

Microsphaera euphorbiae (Pk.) Berk. & Curt., powdery mildew. General (1,5)

Oidium cyparissiae Syd., powdery mildew. Virgin Is. (5)

Peronospora spp., downy mildew. Mass to Fla., Tex., and S.Dak. (2, 3,4,5). Specific identities too confused to warrant definite records: Wilson has referred all American collections on hosts of the Chamaecyse section of Euphorbia to P. chamaecysis G.W. Wils. Gäumann distributes these among 2 European spp., P. euphorbiae Fckl. and P. cyparissias DBy., and one that is recorded only in America, P. euphorbiae-glyptospermae Gäum. In this country all reported hosts belong to the section Chamaesyce.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2,3,5)

Puccinia panici Diet. (O,I), rust. Nebr., N.J. (5)

P. velata (Ell. & Ev.) Arth. (O,II,III). Hawaii (5)

Rhizoctonia solani Kuehn, root rot. N.Y. (5)

Sclerotinia sclerotiorum (Lib.) DBy., stem rot. Mich. (4)

(Scolecotrichum euphorbiae Tracy & Earle): Cercosporidium fasiulatum

Septoriopsis chamaesyceae F.L.Stevens & Dalbey, leaf spot. P.R. (2)

Tilletia euphorbii L.Lenz, stem smut. La. (2)

Uromyces dictyosperma Ell. & Ev. (O,I,II,III), rust. N.Dak. and Mont. to Tex.; Pacific Coast States (5).

U. occidentalis Diet. (O,I). Ariz., Colo., Mont., Nev., N.Mex., Utah (5). II and III on Lupinus spp. The correlated sp. U. coördinatus Arth. (O,I,III) is reported in Calif. and Utah, and U. tranzschelii Syd. (O,III) in Mont. to N.Mex. and Calif. (5, chiefly E. robusta Engelm.)

U. proëminens (DC.) Pass. (O,I,II,III). Three vars. are recognized: U. p. euphorbiicola (Tranz.) Arth. and U. p. typica Arth., both occurring on (2), (3), (4), and other spp. of the section Chamaesyce throughout the U. S. and in tropical America; the correlated U. mayorii Tranz. occurs on (3) and (5) from Kans. to Tex. and Calif. U. p. poinsettiae (Tranz.) Arth. occurs on (1) from Va. to Tex. and Utah.

Mosaic -- undetermined virus. Iowa (2)

HURA (EUPHORBIACEAE)

HURA CREPITANS L., SANDBOX TREE. Tropical American tree, sometimes grown as a juvenile under glass.

Cercospora hurae F.L.Stevens, leaf spot. P.R.

Colletotrichum curvisetum F.L.Stevens, leaf spot. P.R.

Meliola hurae Syd., black mildew. Canal Zone

Parodiopsis perae Arn., black mildew. Canal Zone

STILLINGIA (EUPHORBIACEAE)

STILLINGIA SYLVATICA L. (1), S. LINEARIFOLIA (Muell. Arg.) Small (2), QUEENS DELIGHT. Perennial herbs of the Southeastern and Gulf States; sometimes grown for ornament or for the roots which are used medicinally.

Cercospora stillingiae Ell. & Ev., leaf spot. Tex. (2)
Cuscuta sp., dodder. Okla. (1)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (2)
Uromyces graminicola Burr. (0,I), rust. Okla. (1). II and III on Panicum spp.

TRAGIA (EUPHORBIACEAE)

TRAGIA spp. Perennial herbs of waste ground in the Southern States, some useful to wildlife.

Cercospora euphorbiicola Atk. var. tragia Tharp, leaf spot. Tex.
Cuscuta sp., dodder. Tex. C. coryli Engelm. Okla.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.
Sclerotium sp., stem rot. Tex.

FLACOURTIACEAE

AZARA MICROPHYLLA Hook., AROMO. Evergreen shrub of Chile, grown for ornament in Calif.

Sclerotium rolfsii Sacc., stem rot. Calif.

ONCOBA (FLACOURTIACEAE)

ONCOBA SPINOSA Forsk. Tropical shrub grown for ornament in Calif. and Tex.

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

FOUQUIERIACEAE

FOUQUIERIA SPLENDENS Engelm., OCOTILLO. Tall shrub of desert in the Southwestern States, sometimes grown for ornament or hedges and the wood variously used.

Aecidium cannonii Griff. (0,I), rust. Ariz.
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex.

FUMARIACEAE

CORYDALIS AUREA Willd. (1), C. SEMPERVIRENS (L.) Pers. (2), other spp. (3). Mostly native woodland herbs, annual or biennial, in the Eastern and Central States and westward; also several introduced perennials; grown for ornament.

Heterodera marioni (Cornu) Goodey, root knot. Fla. (3)
Peronospora corydalis DBy., downy mildew. Ind. (1); Md. (2,3); Mass. (2); Okla., Tex. (3). This sp. or perhaps var. intermedia Gäum. also in Kans. (1,2,3); Nebr. (3)
Puccinia aristidae Tracy (0,I), rust. Colo., Kans., Nebr. (1,3). II and III on Aristida and Distichlis.
P. brandegei Pk. (III). Colo., Wash. (3)
Septoria corydalis Ell. & J.J.Davis, leaf spot. Wis. (2); Tex (3)

DICENTRA (FUMARIACEAE)

DICENTRA CANADENSIS Walp., SQUIRREL-CORN (1), and D. CUCULLARIA (L.) Bernh., DUTCHMANS-BREECHES (2). Perennial herbs of woodlands in the N.E. and N. Central States, sometimes grown in wild gardens.

Cerotelium dicentrae [Trel.] Mains & F.W.Anders. (0,I), rust. N.Y. to Md., Kans., and S.Dak. (2). II and III on Urticastrum divaricatum.
Peronospora dicentrae Syd. ex Gäum., downy mildew. Ind., Md., Mich., Mo., N.Y., Va., Wis. (1,2). Initially reported as P. corydalis DBy.

DICENTRA SPECTABILIS DC., BLEEDING-HEART. Hardy perennial of Japan, long cult. in old gardens.

Fusarium sp., wilt. N.J.
Sclerotinia sclerotiorum (Lib.) DBy., wilt, storage rot. Minn.
Sclerotium rolfsii Sacc., stem rot. N.Y.

GENTIANACEAE

EUSTOMA RUSSELLIANUM Griseb., PRAIRIE GENTIAN, TEXAS BLUEBELL. (1). Annual herb of prairies from Nebr. to Tex.; sometimes grown in gardens. Other spp. (2)

Alternaria sp., stem blight (? secondary). Tex. (1)
Cercospora eustomae Pk., leaf spot. Nebr. (1); Colo., Tex. (2)
C. nepheloides Ell. & Holw. Calif. (2); Tex. (1,2)

EUSTOMA cont.
Fusarium solani (Mart.) App. & Wr., root rot. Tex. (1)
Phyllosticta sp., leaf spot. Tex. (1)
Sclerophoma eustomonis Taub. & Ezekiel, stem blight.

EXACUM (GENTIANACEAE)

EXACUM AFFINE Balf., Biennial herb of Socotra (Africa), grown under glass for ornament.

Botrytis cinerea Pers. ex Fr., stem canker, blight. Kans.

FRASERA (GENTIANACEAE)

FRASERA SPECIOSA Dougl. ex Hook. (1), other spp. (2), COLUMBO. Tall biennial or perennial herbs, mostly in the far Western States; sometimes grown in wild gardens.

(Ascochyta fraserae Sacc.): Marssonina f.
Asteroma fraserae Ell. & Ev., black mildew. Colo., Ida. (1)
Cercospora fraserae Ell. & Ev., leaf spot. Colo. (1), Utah (2)
Diplodina fraserae (Ell. & Ev.) Tracy & Earle, on stems. Colo. (1,2)
Marssonina fraserae (Ell. & Ev.) Magn., leaf spot. Ida., Wash. (2)
Phyllosticta fraserae Ell. & Ev., leaf spot. Colo. (2)
Uromyces speciosus Holw. (II,III), rust. Colo. (1,2); N.Mex. (1). O and I unknown.

GENTIANA (GENTIANACEAE)

GENTIANA spp., GENTIAN, as G. ANDREWSII Griseb. (1), G. CRINITA Froel. (2), G. LINEARIS Froel. (3), other spp. (4). Mostly perennial and a few annual herbs, widely distributed in the U.S., many in the West; most spp. have showy flowers, occasionally but not widely cultivated in rock gardens.

Asteromella andrewsii Petr., leaf spot. Ill., Iowa, Nebr., N.J., Pa., W.Va., Wis. (1); Del. (2); Iowa, Wis. (4). Reported as Depazea gentianaecola DC. ex Fr., also Leptothyrium g. and Phyllosticta g., believed to be the conidial stage of Mycosphaerella andrewsii.
?Botrytis cinerea Pers. ex Fr., stem canker, blight. N.Y. (1). See also Sclerotium.
Cercospora gentianae Pk., leaf spot. N.Dak. (1); N.Y., Vt. (3)
C. gentianicola Ell. & Ev., on leaves. Del. (2), Wis. (4)
Fusarium solani (Mart.) App. & Wr., root rot. Md. (2)

GENTIANA cont.

Mycosphaerella andrewsii (Sacc.) J.J.Davis, leaf spot. N.Dak., Wis. (1); ?Del. (4).
M. gentianae (Niessl) Lindau, on stems and leaves Colo. (4)
Phyllosticta gentianicola (gentianaecola)(DC. ex Fr.) Ell. & Ev. See Asteromella andrewsii.
Puccinia gentianae (Strauss) Lk. (O,I,II,III), rust. N.Y. to Ind., Nebr. and Minn. (1); N.Y. (3); Western States to Calif. and Wash., also Alaska (4)
P. haleniae Arth. & Holw. (III), rust. Wyo. (4)
Pucciniastrum alaskanum Mains (II), rust. Alaska (4)
Sclerotium sp., stem rot. N.Y. (1). Perhaps a stage of Botrytis cinerea.
Septoria gentianoides Dearn. & House, on leaves. N.Y. (4)
S. tosevi Bub., on stems and leaves. Colo. (4)
Uromyces gentianae Arth. (II,III), rust. Colo., Iowa, Nev., N.Mex., Wash., Wyo.; N.Car., Vt. (4). O and I unknown.

MENYANTHES (GENTIANACEAE)

MENYANTHES TRIFOLIATA L., BOGBEAN. Perennial herb of bogs in the Northeastern States to Calif. and Alaska; a wildlife food plant.

Ascochyta menyanthis Oud., leaf spot. N.Y.
Botrytis sp., gray-mold blight. N.Y.
Physoderma menyanthis DBy., leaf gall. Mich., N.Y., Wash., Wyo., Alaska.
Septoria menyanthis Desm., leaf spot. Wis.

NYMPHOIDES (GENTIANACEAE)

NYMPHOIDES spp., FLOATING HEART. Perennial aquatic herbs occurring in ponds in the Eastern and Central States and southward, wildlife food plants.

Burrillia decipiens (Wint.) Clint., leaf smut. N.J.
Puccinia scirpi DC. (O,I), rust. Fla. II and III on Scirpus

SABATIA (GENTIANACEAE)

SABATIA (SABBATIA) spp., ROSE-GENTIAN. Annual or biennial herbs of prairies and marshes in the Eastern and Central States; sometimes grown in wild gardens.

Cercospora sabbatiae Ell. & Ev., leaf spot. Del., Miss., N.Car., Okla., Tex.
Gloeosporium sp., anthracnose. Okla.

GERANIACEAE

ERODIUM spp., HERONSBILL, as E. CICUTARIUM (L.) L'Her., ALFILERIA (1), E. MOSCHATUM L'Her. (2), E. TEXANUM A. Gray (3). Annual or biennial herbs, naturalized from Europe (1,2) or native (3); (1) is a widely distributed weed in cultivated ground, all are wildlife food plants.

Heterodera marioni (Cornu) Goodey, root knot.
? H. schachtii A. Schm.
Pseudomonas erodii I.M.Lewis, bacterial spot. Tex. (3)
Pseudoperonospora erodii (Fckl.) G.W.Wils., downy mildew. Mont. (1)
Rhizoctonia solani Kuehn, root rot. Tex. (1,3)
Sclerotium rolfsii Sacc., southern blight. Tex. (1,3)
Synchytrium papillatum Farl., leaf gall. Ariz., Calif., Ore. (1); Calif. (2); Tex. (1,3)

Curly top -- virus (Chlorogenus eutetticola Holmes, Beta virus 1 K.M.Sm.). Calif. (1,2)
Yellows -- virus (Chlorogenus callistephi var. californicus Holmes, Callistephus virus 1A K.M.Sm.) Calif. (1,2)

GERANIUM (GERANIACEAE)

GERANIUM spp., CRANESBILL, as E. CAROLINIANUM L. (1), G. MACULATUM L. (2), G. ROBERTIANUM L. (3), G. SANGUINEUM L. (4), other spp. (5). Annual (1,3) or perennial (2,4) herbs, mostly in woodlands or waste ground; (1,), (2), and (3) widely distributed in the U.S., the latter two sometimes grown in wild gardens and various European and Asiatic spp. may be cult. for ornament (4,5)

Botrytis cinerea Pers. ex Fr., leaf spot. stem rot. Kans., Mo., Alaska (5)
Cercospora geranii Kell. & Swing., leaf spot. Kans. (1); Iowa, Mo., N.Y., Tex., Wis. (2); Colo., Kans., Mont., Tex., Utah, Wyo. (5)
Cylindrosporium geranii Ell. & Ev., leaf spot. La. (1)
Diaporthe eres (Lasch) Nits., on stems. Calif. (5)
Dilophosphora geranii Schroet., leaf spot. Wis. (2)
Erysiphe polygoni DC., powdery mildew. Ill., Ind., Ohio, Pa., W.Va., Wis. (2); Colo., Wyo. (5)
Pestaloziella subsessilis Sacc. & Ell., leaf spot. Miss., Mo., N.J. (1); Wis. (2)
Phyllosticta geranii Ell. & Ev., leaf spot. La., Tex. (1)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1)
Physalospora geranii Cke. & Harkn., on stems. Calif. (5)

GERANIUM cont.

Plasmopara geranii (Pk.) Berl. & DeT., downy mildew. N.J. to Fla., Tex., and Kans. (1); Mass. to Md., Iowa and Wis. (2); this range and west to Tex., Utah, and Mont. (5)

Pseudomonas erodii Lewis, bacterial spot. Fla. (3); Ill., Ind., Ore., Tex. (4)

Puccinia leveillei Mont. (III), rust. Colo., Mont., Utah, Wash., Wyo., Alaska, Hawaii (5)

P. polygoni-amphibii Pers. (0,I). Kans., Tex. (1); Conn. to Miss., Mo., and Minn. (2); Conn., Mont. (5). II and III on Polygonum spp. The form reported here is called var. persicaria (Strauss) Arth. by Arthur.

Ramularia geranii (West.) Fckl., leaf spot. La. (1); Wash., Wyo. (5). See also Venturia glomerata.

Seaverinia (Sclerotinia) geranii (Seaver & Horne) Whet., rhizome rot. N. Y., Wis. (2)

Septoria expansa Niessl, leaf spot. Kans., Tex. (1)

Sphaerotheca humuli (DC.) Burr., powdery mildew. Calif., Mont., Utah, Wash., Wyo. (4). Also the var. fuliginea (Schlecht.) Salm., in Minn., Nebr., Pa., Wis. (2); Ida., Mont., Wash. (4)

? Stigmatea geranii Fr., black leaf speck. Md. (1)

S. robertiani Fr. Mass., N.Y., Vt., W.Va. (4).

Synchytrium geranii Clendenin, leaf gall. La. (1,5); Okla., Tex. (1).

Uromyces geranii (DC.) Fr. (0,I,II,III), rust. Me., Wyo., Alaska (5)

Venturia circinans (Fr.) Sacc., leaf spot. mold. Alaska (5)

V. glomerata Cke. Calif. (1). Said to be the ascigerous stage of Ramularia geranii.

Xanthomonas geranii (Burkh.) Dowson, bacterial leaf spot. N.Y. (3,5).

Mosaic -- virus (Marmor cucumeris Holmes, Cucumis virus 1 K.M.Sm.). Fla. (1)

PELARGONIUM (GERANIACEAE)

PELARGONIUM spp., STORKSBILL, GERANIUM (of florists). Perennial herbs or shrubs, mostly of Africa, widely cult. as house plants, and also in the open, especially in Calif. The numerous horticultural forms usually not discriminated in reports, but the following spp. or vars. sometimes distinguished: P. DOMESTICUM Bailey, LADY WASHINGTON GERANIUMS (1), P. GRAVEOLENS L'Her., ROSE G. (2), P. HORTORUM Bailey (x P. zonale Willd.), FISH G. (3), P. PELTATUM Ait., IVY G. (4).

Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn, crown gall. Md., Mass., Chio. Widely used as experimental host.

PELARGONIUM cont.

Alternaria sp. (A. tenuis Nees ex Cda.), secondary leaf spot. Cosmopolitan.

Aphelenchoides fragariae (Ritz.-Box) Christie, leaf nematode. N.Y.

Ascochyta sp., leaf spot. Conn., N.J.

Aspergillus fischeri Wehmer, Calif.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. Ala.

Botryosporium pulchrum Cda., leaf mold. Occasional in greenhouses.

Botrytis cinerea Pers. ex Fr., gray-mold leaf spot, blossom blight, cutting rot. Cosmopolitan.

Cercospora brunkii Ell. & Gall., leaf spot. Mostly in the South, Fla. to Tex., occasionally north: Md., Ohio, N.H.; commonly on (4), sometimes (2,3)

Corynebacterium fascians (Tilford) Dowson, fasciation. Mass., Ohio

Diaporthe meduseae Nits., on stems. Calif.

Fusarium sp. (? F. merismoides Cda.), stem rot, wilt (? secondary). Ind., N.Y., Wash.

Gloeosporium pelargonii Cke. & Mass., on leaves. P.R. (2)

Heterodera marioni (Cornu) Goodey, root knot. Conn., Fla., N.J., Ohio, Ore.

Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves. Md. (2), N.J. (3)

Pleosphaerulina sp., leaf spot. Pa.

Pseudomonas erodii Lewis, bacterial leaf spot. Ala., Fla., Miss., Mo., Tex.; occasionally north, Conn. to Ill., Ore., Wash. Probably confused in part with Xanthomonas pelargonii.

Pythium spp., blackleg, stem rot. cutting rot. Cosmopolitan. P. debaryanum Hesse identified in Md.; P. mamillatum Meurs in N.Y.; P. splendens Braun in Md.; P. ultimum Trow in N.J., N.Y.; P. vexans DBy. in Md., Okla., Pa., Hawaii. Reported on (1), (2), (3)

Rhizoctonia solani Kuehn, stem rot. Cosmopolitan

Thielaviopsis basicola (Berk. & Br.) Ferr., root rot. Conn.

Verticillium albo-atrum Reinke & Berth., wilt. Calif. (1,3), N.Y.

Xanthomonas pelargonii (N.A.Brown) Starr & Burkh., bacterial leaf spot. Mass. to Va., Miss., and Ohio; also Calif., Wash. On (3), (4), and probably other types.

Curly top -- virus (Chlorogenus eutetticola Holmes, Beta virus 1 K.M.Sm.) Calif. (1,3)

Leaf curl, crinkle -- virus (Marmor pelargonii Holmes, Pelargonium virus 1 K.M.Sm.). Minn., N.J., Ohio, Pa., Wash.; probably general (3).

Mosaic -- virus (in part Marmor cucumeris Holmes, Cucumis virus 1 K.M.Sm.; in part unidentified) Fla., Ind., Minn., N.J., N.Y., Pa., Wash.

Spotted wilt -- virus (Lethum australiense Holmes, Lycopersicon virus 3 K.M.Sm.) Calif., Tex. (1,2)

PELARGONIUM cont.

Intumescence, oedema (dropsy) -- physiological, attributed to excessive soil moisture and retarded transpiration. Frequent in greenhouse culture; in the open similar symptoms may result from leaf-curl virus.

GESNERIACEAE

SAINTPAULIA

SAINTPAULIA ICNANTHA Wendl., AFRICAN-VIOLET. Perennial herb of tropical Africa, widely grown for ornament as an indoor pot plant.

Aphelenchoides fragariae (Ritz.-Bos) Christie, leaf nematode. Calif.
Botrytis cinerea Pers. ex Fr., gray-mold blight, leaf rot. Reported in N.Y., doubtless cosmopolitan.
Heterodera marioni (Cornu) Goodey, root knot. Md.
Pratylenchus sp., root nematode. Md.
Pythium ultimum Trow, root and crown rot. Calif.

Ring spot -- physiological attributed to wetting foliage with cold water. General.

SINNINGIA (GESNERIACEAE)

SINNINGIA SPECIOSA Benth. & Hook., GLOXINIA. Tuberous-rooted herb of Brazil, grown as a pot plant under glass for ornament; commercial production chiefly in Calif.

Botrytis cinerea Pers. ex Fr., bud rot. Calif.
Cladosporium ? herbarum Lk. ex Fr., leaf rot. N.J.
Phytophthora cryptogea Pethyb. & Laf., root and crown rot. Calif.
Pythium ultimum Trow, root rot. Calif.
Sclerotinia sclerotiorum (Lib.) DBy., crown rot. Calif.

Spotted wilt -- virus (Lethum australiense Holmes, Lycopersicon virus 3 K.M.Sm.). Calif., Mo., Tex.
Boron deficiency -- seedling dieback and wilt. Calif.

HYDROPHYLLACEAE

ERIODICTYON. See PDR 25: 138. 1941.

HYDROPHYLLUM (HYDROPHYLLACEAE)

HYDROPHYLLUM spp., WATERLEAF, as H. CANADENSE L. (1), H. CAPITATUM Dougl. (2), H. OCCIDENTALE A. Gray (3), H.VIRGINIANUM L. (4), other spp. (5). Perennial or biennial woodland herbs (1) and (4) in the Eastern and Central States, (2) and (3) in the West; sometimes grown in wild gardens.

Ascochyta hydrophylli Sprague & F.D.Bailey, leaf spot. Ore. (5)
Erysiphe cichoracearum DC., powdery mildew. Occasional on all spp. named and others throughout their range.
E. polygoni DC. Ida. (2), Wash. (5)
Gloeosporium hydrophylli Dearn. & House, leaf spot. N.Y. (1,4)
Peronospora hydrophylli Waite, downy mildew. Wash. (2); Ill., Iowa, N.Y., Wis. (4); Md. (5)
Puccinia hydrophylli Pk. & G.W.Clint. (III), rust. Colo., Utah (2); Calif. (3); N.Y to Nebr. and N.Dak. (4); also on other spp. in this range.
P. rubigo-vera (DC.) Wint. var. apocrypta (Ell. & Tracy) Arth. (0,I), rust. Mont. to Colo., Utah and Wash. (2); Calif. (3); N.Y. to Nebr. and N.Dak. (4); also on other spp. in this range. II and III on Agropyron, Elymus, and other grasses. A form with 0 and I on Hydrophyllum, II and III on Elymus has been designated sp. f. hydrophylli Mains.
Ramularia hydrophylli Ell. & Ev., leaf spot. Wash. (2)
Septocylindrium hydrophylli Daniels, leaf spot. Ill. (1)
Septoria hydrophylli Ell. & Dearn., leaf spot. N.Y. (1,4)
Sphaerotheca humuli (DC.) Burr., powdery mildew. Ohio (1); N.&S. Dak. (4); Also var. fuliginea (Schlecht.) Salm. in Minn., N. Dak. (4)

NEMOPHILA (HYDROPHYLLACEAE)

NEMOPHILA MENZIESII Hook. & Arn., BABY BLUE-EYES (1); other spp. (2). Small annual herbs, mostly of California, sometimes grown in gardens.

Erysiphe cichoracearum DC., powdery mildew. Calif. (1,2); Tex. (1); Nev., Wash. (2)

PHACELIA (HYDROPHYLLACEAE)

PHACELIA LEUCOPHYLLA Torr. (1); P. WHITLAVIA A.Gray, CALIFORNIA BLUE-BELL (2); other spp. (3). Mostly annual (1) and several perennial herbs of the far Western States; several of ornamental value; (1) and related forms often grown in gardens.

PHACELIA cont.

Cylindrosporium phaceliae Ell. & Ev., leaf spot. Mont., Tex. (3)
Erysiphe cichoracearum DC., powdery mildew. Calif., Mont., N.Mex., Tex. (3)
Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (3)
Puccinia aristidae Tracy (0,I), rust. Ariz. (3). II and III on Distichlis and other grasses.
P. phaceliae Syd. & Holw. (III). Wash. (3)
P. rubigo-vera (DC.) Wint. var. apocrypta (Ell. & Tracy) Arth., (0,I). Mont. to Colo. and Ore. (1); also to Calif. and N.Mex. (3). A form with II and III on Bromus spp. has been designated sp. f. phaceliae Mains.
Uredo contraria Arth. (II), rust. Calif. (3)

Curly top -- virus (Chlorogenus eutetticola Holmes, Beta virus 1 K.M.Sm.), Calif. (3)

ROMANZOFFIA (HYDROPHYLLACEAE)

ROMANZOFFIA SITCHENSIS Bong. Perennial herb of Pacific Coast, grown in rock gardens.

Puccinia romanzoffiae Jacks. (III), rust. Ore.

HYPERICACEAE

ASCYRUM

ASCYRUM HYPERICOIDES L., ST. ANDREWS CROSS (1); A. STANS Michx., ST. PETERSWORT (2). Low woody perennials, commonly in pine barrens near the Atlantic and Gulf Coasts; grown in rock gardens and borders.

Cladosporium gloeosporioides Atk., leaf spot. Ala. (2)
Fusicladium ascyrinum Ell. & Ev., on floral bracts. La. (1)
Uromyces hyperici (Spreng.) Curt. (0,I,II,III), rust. Miss., N.J., Tex. (1)

HYPERICUM (HYPERICACEAE)

HYPERICUM spp., St. JOHNS-WORT. Mostly perennial herbs and shrubs, some evergreen and a few annual, native and introduced, widely distributed in the U.S.; many are grown for ornament in rock gardens and borders, several are wildlife food plants, a few are weeds in cultivated ground. The following are typical: H.

HYPERICUM cont.
FRONDOSUM Michx. (1), H. KALMIANUM L. (2), H. MUTILUM L. (3), H. PERFORATUM L. (4), H. PROLIFICUM L. (5), H. VIRGINICUM L. (6), others (7).

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on stems. Pa. (5); ? S.Car. (6)
Cercospora hyperici Tehon & Daniels, leaf spot. Ill. (7)
Cladosporium gloeosporioides Atk., leaf and stem spot. Ala., N.J., Wis. (3); N.Y., Wis. (6). Perhaps a Cercospora.
Didymella prominens Ell. & Ev., on stems. Ga. (7)
Erysiphe cichoracearum DC., powdery mildew.
Gibberidea heliopsidis (Schw.) Shear, black knot on stems. Md. (7)
Gloeosporium cladosporioides Ell. & Halst. See Cladosporium gloeosporioides.
Heterodera marioni (Cornu) Goodey, root knot. Fla. (4), Md. (7)
Leptostroma hyperici Schw., on stems. Pa. (4)
Mycosphaerella sp. (Sphaerella hypericina Ell.), on leaves. N.J. (2,5), Ill. (7)
Rhabdospora sphaerelloides (Ell. & Kell.) Sacc. & Syd., on stems. Kans., Ohio, Wis. (7)
Uromyces hyperici (Spreng.) Curt. (0,I,II,III), rust. N.Car. (1); Ill., N.Y., Wis. (2); Me. to Ala. and Iowa (3); Me., N.Y., Pa., (4); Pa. to Miss., Tex., and Wis. (5); Me. to Fla., Mo. and Wis. (6); also on other spp. in this range and in Calif.

IRIDACEAE

BABIANA sp. Cormous herb of S. Africa, grown for ornament.

Mosaic -- iris mosaic virus. Calif.

BELAMCANDA (IRIDACEAE)

BELAMCANDA CHINENSIS (L.) DC., BLACKBERRY-LILY. Perennial herb of e. Asia, grown for ornament and locally naturalized in East and South.

Alternaria sp., leaf spot. Kans., Va.
Heterosporium iridis (Fautr. & Roum.) Jacques, leaf spot. Calif., Kans., N.Y., Okla., Va., Vt.

CROCUS (IRIDACEAE)

CROCUS spp. Hardy cormous herbs, mostly of s. Europe and s.w. Asia, grown as pot plants and naturalized in gardens. Our reports usually do not discriminate as to spp., but the more commonly grown garden crocuses belong to C. biflorus Mill., C. susianus Ker., C. moesiacus Ker., and C. vernus All. -- spring flowering, and C. sativus L., -- autumn flowering.

Fusarium oxysporum Schlecht., corm rot. N.Y., Pa.; also observed in imported stocks. Various strains implicated, the form lilii Ime identified in one instance, and F. orthoceras var. gladioli also shown pathogenic.
Penicillium sp. (? P. gladioli McCul. & Thom), blue-mold rot. Observed on imported stocks.
Pseudomonas marginata (McCul.) Stapp, scab. Observed occasionally on imported stocks.
Stromatinia gladioli (Drayton) Whet. (Sclerotinia g.), dry rot. Reported in N.J., N.Y., and ? Wash.; frequently observed on imported stocks and probably widespread.

Mosaic -- virus (? Marmor iridis Holmes, Iris virus 1 K.M.Sm.). Calif., Md.

FREESIA (IRIDACEAE)

FREESIA HYBRIDA Hort. (cultigen derived from F. refracta Klatt. and other spp.), FREESIA. Cormous herbs of S.Africa, extensively grown under glass for cut flowers and indoors as pot plants; commercial corm production chiefly in Calif. and Tex.

Fusarium spp., root rot, wilt, corm rot. Calif., Fla., Tex.; also in commercial stocks from these sources and abroad. Various strains of F. oxysporum Schlecht. implicated, F. orthoceras var. gladioli among others; also F. solani (Mart.) App. & Wr. in Tex.
Heterodera marioni (Cornu) Goodey, root knot. Calif.
Heterosporium iridis (Fautr. & Roum.) Jacques, leaf spot. Conn.
Penicillium sp. (? P. gladioli McCul. & Thom), bluemold rot.
Pseudomonas marginata (McCul.) Stapp, scab. Wash.
Stromatinia gladioli (Drayton) Whet., dry rot. N.J., N.Y.

Mosaic -- virus (? Marmor iridis Holmes, Iris virus 1 K.M.Sm.). Calif. Also observed in commercial stocks from various sources.
Red bulb -- cause unknown, probably in part Fusarium core rot. Calif., also in imported stocks.

FREESIA cont.
"Rust" -- cause unknown but not a true rust. Calif.

GLADIOLUS (IRIDACEAE)

GLADIOLUS HORTULANUS Bailey (complex cultigen derived from x G. gandavensis Van Houtte, G. psittacinus Hook., G. primulinus Baker, and others), GLADIOLUS. Cormous herbs of tropical and S. Africa, long and extensively cultivated for ornament as a garden flower and for commercial cutting both in the open and under glass.

Alternaria spp., probably mostly A. tenuis Nees ex Cda., secondary leaf spot. Cosmopolitan. Other spp., perhaps A. tenuissinea (Fr.) Wiltshire, also reported; none shown parasitic.
Botrytis sp., leaf and flower spot, "fire". Calif., Fla., Ore., Wash.
B. cinerea Pers. ex Fr. (?B. gladioli Kleb.), corm rot, wet rot. Calif., Fla., N.J., N.Y., Ore., Wash., Wis., Alaska.
Cladosporium herbarum Lk. ex Fr., secondary leaf spot (or saprophytic). Cosmopolitan.
Curvularia lunata (Wakker) Boed., brown spot (foliage and flowers). Fla.
?Erwinia carotovora (L.R.Jones) Holland, soft rot. Mich.
Fusarium orthoceras App. & Wr. var. gladioli McCul., corm rot, wilt, yellows; ? basal rot. N.Y. to Fla., Tex. and Minn.; Calif. A form of F. oxysporum but different from the following.
F. oxysporum Schlecht. f. gladioli (Massey) Snyder & Hansen, Fusarium rot (in storage), ? basal rot. General, except perhaps New England and the Pacific Northwest.
Heterodera marioni (Cornu) Goodey, root knot. N.Car. to Fla. and Tex.; Calif.
Heterosporium sp. (? H. iridis (Fautr. & Roum.) Jacques), leaf spot. Md.
Macrophoma gladioli (Cke.) Berl. & Vogl., on leaves. S.Car.
Papulaspora spp., saprophytic on decaying corms but sometimes confused with smut, Urocystis gladioli W.G.Sm., not known in U.S. Several spp. identified as P. appendicularis H.H.Hotson, P. coprophila J.W.Hotson, and P. dodgei Conners, reported in N.Y.; P. rubida J.W.Hotson, in Pa.
Penicillium gladioli McCul. & Thom, corm rot (in storage): General in the North from Mass. to Colo. and Wash.; occasional southward to Tex. and Calif. Other Penicillium spp. sometimes associated with this and other corm rots.
Phyllosticta gladioli Ell. & Ev., on leaves. Ala., S.Car. Perhaps synonymous with Macrophoma gladioli.
Pseudomonas marginata (McCul.) Stapp, scab (on corms), neck rot, leaf spot. General.

GLADIOLUS cont.

Rhizoctonia solani Kuehn, root rot. N.J., N.Dak., Tex. Leaf-base rot. Ill., Tex.

(Sclerotinia gladioli Drayton, Sclerotium g. Massey): Stromatinia g.

Stromatinia gladioli (Drayton) Whet., dry rot (of corms), leaf and stalk rot. General.

Sclerotium rolfsii Sacc., southern blight. Fla.

Septoria gladioli Pass., hard rot (of corms), leaf spot. General.

Stemphyllium sp., leaf and stem spot. Fla.

Xanthomonas gummisudans (McCul.) Starr & Burkh., bacterial blight. N.Y. to Mo. and N.Dak., Wash.

Mosaic -- virus(es). In part caused by a strain of yellow bean mosaic virus, distinguished as mild mosaic; in part caused by a suspected but unproved virus, distinguished as "white break". The latter is probably the disease usually reported as mosaic and is reported from N.Y. to Ill., Calif. and Wash.; mild mosaic occurs widely in commercial stocks.

"Rust" -- nonparasitic spot necrosis of leaves, attributed to action of sunlight on water drops. Occasional in Eastern and Central States.

IRIS (IRIDACEAE)

IRIS spp. (bulbous): Horticultural types derived from I. XIPHIOIDES Ehrh., ENGLISH IRIS (1); I. XIPHIUM L., SPANISH I. (2); I. XIPHIUM and I. FILIFOLIA Boiss. hybrids, DUTCH I. (3); others (4).

Alternaria sp. (? A. tenuis Nees ex Cda.), leaf blight (? secondary). N.Car., Ore.

Aphelenchoides parietinus (Bast.) Steiner, root-plate and scale necrosis. Mich., N.Y., N.Car., Tex., Wash.; also in imported stocks (3)

Botrytis sp. (? B. cinerea Pers. ex Fr.), gray-mold blight. Ore.

Didymellina macrospora Kleb. (D. iridis Amer. auths., ? (Desm.) Hoehn.), leaf blight. Calif., N.Car., Ore., Wash. (2,3). This sp. has been definitely connected with the conidial stage Heterosporium iridis whereas D. iridis (Desm.) Hoehn. is known only in the ascigerous stage. Much of the American material identified as H. iridis (H. gracile) or D. iridis belongs here but not necessarily all of it.

D. poecilospora McWhorter, on leaves (secondary leaf spot. Ore. (3). The name is a nomen nudum; the conidial stage is an unnamed Heterosporium.

Ditylenchus dipsaci Kuehn, Filip., root-plate and scale necrosis. Fla., N.Y., N.&S.Car., Ore., Va., Wash.; also sometimes in commercial bulbs from these sources and in imported stocks (1,2,3).

IRIS cont.

Fusarium sp. (various strains of F. oxysporum Schlecht.), basal rot, dry rot (bulbs and roots). Ariz., Calif., N.Y., N.Car., Ore., Tex., Va., Wash. (2,3)

Glomerella cingulata (Ston.) Spauld. & Schrenk, flower spot. Md. (2)

Heterodera marioni (Cornu) Goodey, root knot. N.Car. (2)

Heterosporium iridis (Fautr. & Roum.) Jacques (also reported as H. gracile (Wallr.) Sacc. but misnamed). See Didymellina macrospora.

Mystrosporium adustum Massee, leaf blight, ink disease (of bulbs). N.Car., Ore., Va. (2,3)

Penicillium spp., blue-mold rot. General (1,2,3). P. corymbiferum Westling or P. hirsutum Dierckx have been frequently identified, P. gladioli McCul. & Thom and P. digitatum Sacc. also reported.

Puccinia iridis (DC.) Wallr. (II,III), rust. Ind. (1,2,3); Calif., La., N.Car. (2,3). O and I on Valeriana officinalis in Asia, not known in America.

Rhizoctonia solani Kuehn, root rot. N.Car., Wash. (3)

Sclerotium rolfsii Sacc., southern blight, white bulb rot. Calif., Fla., Md., N.&S.Car., Ore., Tex. (1,2,3). S. delphinii Welch, Conn. (2)

S. tuliparum Kleb., bulb rot. N.J. (2)

Mosaic -- virus (Marmor iridis Holmes, Iris virus 1 K.M.Sm.). General (1,2,3)

IRIS spp. (rhizomatous). Horticultural types derived from I. GERMANICA L., I. PALLIDA Lam., I. VARIEGATA L., and others, BEARDED IRIS (1); I. KAEMPFERI Sieb. and I. LAEVIGATA Fisch., JAPANESE I. (2); I. SIBIRICA L. and I. ORIENTALIS Thunb., SIBERIAN I. (3); other garden spp. (4):

Alternaria iridicola (Ell. & Ev.) J.A.Elliott, leaf spot. Ill., Wis. (1)

Ascochyta iridis Oud., leaf spot. Md., N.Y. (1)

Bacterium tardicrescens McCul., bacterial leaf spot. Mass. to Ala., Ind. and Minn. Natural infection reported only on (1), but (2) and (3) have been experimentally infected: Probably confused in some reports with Erwinia carotovora.

Botryotinia convoluta (Drayton) Whet., gray-mold rot, crown rot. Minn., N.J., N.Y., Wash. (1)

Botrytis cinerea Pers. ex Fr., blossom blight. Mass. (1)

Cladosporium herbarum Lk. ex Fr., secondary leaf spot. Reported in Mich., doubtless cosmopolitan (1)

Didymellina macrospora Kleb., leaf spot. General (1); Kans. (3); Calif., Ind., Nebr. (4)

Erwinia carotovora (L.R.Jones) Holland, bacterial soft rot of rhizomes, leaf blight. General (1); Ind. (2,4). See also Bacterium tardicrescens.

IRIS cont.

Fusarium sp., root rot. N.J., N.Y. (2)

(Heterosporium iridis (Fautr. & Roum.) Jacques): Didymellina macrospora.

? Kabatiella microsticta Bub., secondary leaf spot. Md., N.J., N.Y., Cre., Va.

Leptosphaeria heterospora (DeNot.) Niessl, on rhizomes and roots, probably saprophytic. Md., Va. (1)

Puccinia iridis (DC.) Wallr. (II,III), rust. Calif. (1); Ind. (4). Evidence of complex specialization in this rust, not correlated with horticultural grouping of hosts, has been presented by Mains; most garden irises are resistant to races known in the U.S.

Rhizoctonia solani Kuehn, root rot, damping off of seedlings. Occasional (1)

Sclerotium rolfsii Sacc., southern blight, white rot. N.Y. to Fla. and Tex. (1). The form known as S. delphinii Welch is reported on (2) in Conn., on (3) in Mass.

Scolecotrichum punctulatum Tracy & Earle, on leaves. Miss. (4)

Mosaic -- virus (? Marmor iridis Holmes, Iris virus 1 K.M.Sm., but perhaps a different strain from the common virus of bulbous iris). Calif., N.J., N.Y. (1)

IRIS spp. (native), as I. CRISTATA SOLAND (1), I. FULVA Ker-Gawl (2), I. MISSCURIENSIS Nutt. (3), I. TENAS Dougl. (4), I. VERSICOLOR L. (5), others (6). Perennial herbs commonly in meadows or marshy ground, ranging from the Southeast (1), the South-Central (2) and many others, the Northeast and North Central (5), the West (3), and the Pacific Northwest (4). Some have ornamental value and are cult. in gardens, also furnish food for wildlife.

Alternaria iridicola (Ell. & Ev.) J.A.Elliott, leaf spot. Mont., Wash. (3)

Asteroma verulosum (Wallr.) Fckl., on leaves. Wis.(5).

Bacterium tardicrescens McCul., bacterial leaf spot. Conn., Wash. (1)

Colletotrichum liliacearum (Schw.) Ferr., on leaves. Ala., W.Va. (1)

Cylindrosporium iridis Ell. & Halst., Ind., N.Y. (5)

Didymellina macrospora Kleb., leaf spot. Calif., Md., Ind., Kans., Okla. (5)

Didymosphaeria saccata Clem., Colo., Ida. (3)

Mycosphaerella sp., on old leaves, ? leaf spot. N.Mex. (3). Reported as M. iridis (Auers.) Schroet., which is held to be a synonym of Didymellina iridis (Desm.) Hoehn.

Phoma iridina Sacc., Mont. (3)

Phyllosticta iridis Ell. & Mart., leaf spot. Fla., Mich., N.Y., Ohio (5); Wis. (5,6)

IRIS cont.

Puccinia iridis (DC.) Wallr. (II,III), rust. Ind., La., N.Y., Ohio (2); Ariz., Calif., Colo., Ida., N.Mex., Wash. (3); Ore. (4); Me. to Ind., La., and Iowa (5); also on other native spp. in this range.

P. sessilis Schneid. (O,I), rust. Me. to Ind., Nebr., and Minn. II and III on Phalaris arundinacea.

Sclerotium delphinii Welch, rhizome rot. Conn. (1)

Scolecotrichum punctulatum Tracy & Earle, on leaves. Miss. (6)

IXIA (IRIDACEAE)

IXIA spp. Cormous herbs of S.Africa, grown for ornament indoors or in the open in the South

Fusarium orthoceras App. & Wr. var. gladioli McCul., corm rot. Observed in commercial stocks.

Sclerotium sp. (? S. tuliparum Kleb.), corm rot. In commercial stocks.

Mosaic -- virus (? Marmor iridis Holmes, Iris virus 1 K.M.Sm.). Calif.; also in commercial stocks.

SISYRINCHIUM (IRIDACEAE)

SISYRINCHIUM spp., BLUE-EYED-GRASS. Grasslike perennials, widely distributed in the U.S.; several are cult. for ornament, as S. ANGUSTIFOLIUM Mill. (1), S. DOUGLASII Dietr. (2), S. GRAMINOIDES Bickn. (3), others (4).

Aecidium residuum Arth. (O,I), rust. Okla. (3)

Kellermania sisyrinchii Ell. & Ev., ? leaf blight. N.Dak. (1); Calif.; N.Mex. (4)

Pratylenchus pratensis (DeMan) Filip., root nematode.

Uromyces houstoniatus [Schw.] Sheldon (II,III), rust. Me. (1); W.Va. (3). O and I on Houstonia spp.

U. probus Arth. (I,II,III), rust. Ida., Ore., Utah, Wash. (2)

SPARAXIS (IRIDACEAE)

SPARAXIS TRICOLOR Ker-Gawl, WAND-FLOWER. Cormous herb of S.Africa, cult. for ornament.

Mosaic -- virus (? Marmor iridis Holmes, Iris virus 1 K.M.Sm.). Calif., Ore.

STREPTANTHERA (IRIDACEAE)

STREPTANTHERA CUPREA Sweet. Cormous herb of S.Africa, cult. for ornament.

Mosaic -- virus (? Marmor iridis Holmes, Iris virus 1 K.M.Sm.). Calif.

TIGRIDIA (IRIDACEAE)

TIGRIDIA PAVONIA Ker-Gawl, TIGER-FLOWER. Bulbous herb of Mexico and Central America, cult. in many varieties for summer flowering.

Ditylenchus dipsaci (Kuehn) Filip, bulb nematode. In commercial stocks.
Fusarium orthoceras App. & Wr. var. gladioli McCul., internal rot. Observed in commercial stocks.
Penicillium gladioli McCul. & Thom, storage rot. N.Y.; also in commerical stocks.
Pseudomonas marginata McCul., scab. Md.

Mosaic -- virus (? Marmor iridis Holmes, Iris virus 1 K.M.Sm.). Ore., Wash.; also in commercial stocks.

TRITONIA (IRIDACEAE)

TRITONIA spp. (MONTBRETIA of florists). Cormous herbs of S. Africa, grown for ornament under glass and in the open.

Alternaria sp., leaf blight (? secondary). N.H.
Fusarium orthoceras App. & Wr. var. gladioli McCul., corm rot, yellows. Calif.; also in commercial stocks.
Heterosporium sp. (? H. iridis (Fautr. & Roum.) Jacques. = Didymellina macrospora Kleb.), leaf blight. Ore., Wash.
Sclerotium rolfsii Sacc., southern blight. Calif.
Stromatinia gladioli (Drayton) Whet., corm rot. In commercial stocks.

Mosaic -- virus (? Marmor iridis Holmes, Iris virus 1 K.M.Sm.). Calif., Ore.

WATSONIA (IRIDACEAE)

WATSONIA spp. Cormous herbs of S. Africa, cult. for summer flowering, chiefly in Calif.

Armillaria mellea Vahl ex Fr., root rot. Calif.

WATSONIA cont.
Mosaic -- virus (? Marmor iridis Holmes, Iris virus 1 K.M.Sm.).
Calif.

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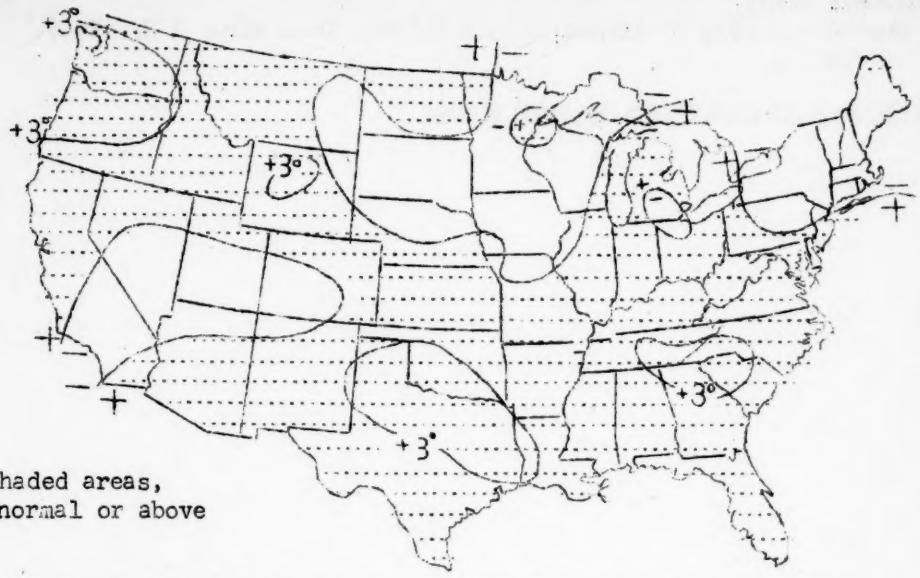
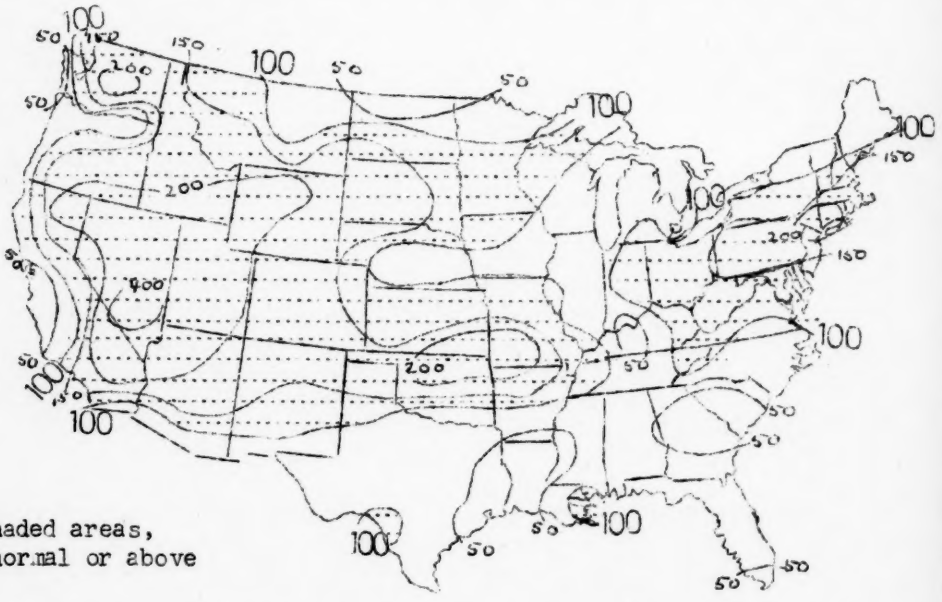


Map I. Departure of mean temperature from normal, June, 1948



Map II. Percentage of normal precipitation, June, 1948

JUNE WEATHER

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